

PUBLIC ABSTRACT

Applicant (primary) name: **ADA Environmental Solutions, LLC**

Applicant's address: **8100 SouthPark Way, B-2, Littleton, CO 80120**

Team Members **ADA-ES
USGen New England INC. ("USGenNE")
Energy and Environmental Strategies**

Proposal Title: **"Demonstrating the Multi³ Multi Pollution Control System"**

Commercial Application: ☐ New Facilities ☒ Existing Facilities

Technology Type: **Fossil Energy R&D, Air Pollution Control from Coal-Fired Power Plants**

Total Estimated Cost: \$152,192,588

Estimated DOE Share: \$76,096,294

Estimated Private Share: \$76,096,294

Anticipated Project Sites: **USGenNE
Salem Harbor Station
24 Fort Ave.
Salem, MA 01970-5623**

Type of coal to be used: **Low-Sulfur Bituminous**

Size or scale of project: **315 MW Total (Unit 1 = 84 MW, Unit 2 = 81 MW, Unit 3 = 150 MW net)**

Duration of proposed project: **60 months**

PRIMARY CONTACT:

For additional information,

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Brief description of project:

Many coal-fired power plants are considering installing pollution controls for air pollutants such as sulfur oxides, nitrogen oxides, mercury and particulates. Many of the power generating units at these plants are relatively small in size, with more than 50% being 200 MW in capacity or less. This class of generating unit produces about 40,000 MW of the nation's electricity and this capacity can continue to be productive, but only if cost-effective pollution controls are installed.

The proposed project will be conducted at USGenNE's Salem Harbor Station (Salem, MA) and focuses on designing, installing and demonstrating a single multi-pollution control system known as Multi³ that will treat the emissions from three small generating units. Significant capital costs are saved using this unique multiple unit emission control approach. This approach is particularly suited for sites that are constrained by equipment configuration and/or by the amount of real estate that is available for installing additional equipment. The project will also demonstrate a novel process for treating fly ash to produce a product suitable for concrete.

The overall objective of this project is to demonstrate an integrated multi-pollutant control system on three Salem Harbor coal-fired boilers. The system will consist of state-of-the-art NO_x controls, acid gas controls, mercury controls, particulate controls, ash processing facilities, and an integration system composed of advanced sensors and software.

Specific objectives of the project are:

- Demonstrate NO_x emission levels to below 0.10 lb/Mbtu;
- Demonstrate SO₂ emissions levels to below 0.15 lb/Mbtu;
- Demonstrate 90+% mercury capture from inlet levels;
- Utilize 100% of the ash captured by the ESPs;
- Reduce emissions of acid gases and fine particles significantly;
- Successfully utilize recycled wastewater in the SDA;
- Modify, install and demonstrate new process and/or emissions monitors; and
- Successfully integrate the entire system so that all subsystems are operating at peak performance.

The scope of work covers five Phases over a five year period. Phase 1 covers a one year time period for preliminary design and permit acquisition functions. Phase 2 also covers one year and involves final design of the various subsystems. Phase 3 is devoted to installation and construction and will cover a period of 18 months. Demonstration activities will occur during the 18-month Phase 4 period. System operation, performance, optimization, and integration functions will be reported. Phase 5 is reserved for reporting and project management functions and spans the full 5-year project schedule.

The proposed project meets most of the stated DOE CCPI objectives in a single project:

Reducing Emissions

- Mercury control (ESP plus SDA/FF combination,)
- NO_x control using clean-side SCR
- SO₂ control using SDA
- PM control using existing ESPs and new baghouse
- Acid gas control using the SDA and baghouse

Multi-Pollution Control

- The project ties all pollution controls into a single integrated unit

Byproduct Utilization, Treatment and Disposal

- Fly ash beneficiation with integrated mercury control technology
- The baghouse will allow possible reuse of SDA products
- Assessment of how powdered activated carbon, or other sorbents affect combustion byproducts

Water Utilization and Conservation

- Proposed use of recycled water from a neighboring publicly owned treatment facility in the SDA

Innovations to be Demonstrated

- Single SCR-SDA-Baghouse to treat multiple units

- ESP/SDA/Baghouse configuration
- Clean-side SCR
- Use of recycled water in SDA
- Ash beneficiation and utilization

Benefits of the project include: 1) providing the industry with a proven and cost effective retrofit or upgrade for existing power plants to meet multiple pollution control regulations, 2) providing the regulatory community with broader information upon which to establish regulatory frameworks, 3) providing information that power companies can use in their strategic planning to meet future control requirements, and 4) providing for the continued clean use of coal, a significant source of U.S. energy and national security.

List of Acronyms

ESP	Electrostatic Precipitator
FF	Fabric Filter
SDA	Spray Dryer Absorber
SCR	Selective Catalytic Reduction
DOE	Department of Energy
CCPI	Clean Coal Power Initiative